CLAIMS

1.   A personal identification method through the measurement of subcutaneous bloodstream comprising:

(1) a step of expanding and irradiating a laser beam to a finger pad and focusing light reflected from a blood vessel layer under skin onto an image sensor plane as laser speckles by using an optical system;

(2) a step of determining an amount representing the rate of time variation of the amount of received light at each pixel point in the laser speckles and setting the numerical value thus achieved as a two-dimensional map to thereby achieve a bloodstream map of the finger pad; and

(3) a step of comparing a fingerprint pattern appearing as the bloodstream map with pre-registered personal data for identification.

2.   A personal identification method through the measurement of subcutaneous bloodstream comprising:

(1) a step of expanding and irradiating a laser beam to a finger pad and focusing light reflected from a blood vessel layer under skin onto an image sensor plane as laser speckles by using an optical system;

(2) a step of determining an amount representing the rate of time variation of the amount of received light at each pixel point in the laser speckles and setting the numerical value concerned as a two-dimensional map to achieve a bloodstream map of the finger pad;

(3) a step of comparing a fingerprint pattern appearing as the bloodstream map with pre-registered personal data for identification; and

(4) a step of determining a time variation of average bloodstream in the whole area or some area and comparing the time variation with a predetermined reference for identification.

3.   A personal identification device comprising: irradiating means for expanding a laser beam and irradiating the expanded laser beam to a finger pad; light receiving means that has many pixels and receives light reflected from the finger pad; storage

11

means for storing the output of each pixel achieved by the light receiving means; calculation means for calculating an amount representing the rate of time variation of the received light amount at each pixel from the storage content of the storage means; second storage means for storing a two-dimensional distribution of the calculation result achieved at each pixel as a fingerprint pattern; and means for comparing the fingerprint pattern stored in the second storage means with pre-registered personal data for identification.

4. A personal identification device comprising: irradiating means for expanding a laser beam and irradiating the expanded laser beam to a finger pad; light receiving means that has many pixels and receives light reflected from the finger pad; storage means for storing the output of each pixel achieved by the light receiving means; calculation means for calculating an amount representing the rate of time variation of the received light amount at each pixel from the storage content of the storage means; second storage means for storing a two-dimensional distribution of the calculation result achieved at each pixel as a fingerprint pattern; means for comparing the fingerprint pattern stored in the second storage means with pre-registered personal data for identification; and means for calculating time variation of average bloodstream in the whole area or some area and comparing the time variation concerned with a predetermined reference for identification.